ELIZADE UNIVERSITY, ILARA – MOKIN

FACULTY OF ENGINEERING

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

First Semester, 2020/2021

HOD'S SIGNATURE

Course Title: Elements of Foundation Engineering
Course Code: CVE 409 **Units:** 3
Instructions: (1) Answer Q. 1, 2 and 3, and ANY other one.
(2) Questions 1 to 6 carry equal marks
Time Allowed: 3 hours

Question 1

In Diagram Q.1, all loads are on a horizontal plane, except point A which is 12m below.
Four loads are as shown in the diagram as follows:

- A vertical point load of 50kN,
- A vertical point load of 30kN,
- A vertical line of 18kN/m, and
- A line load of 18kN/m, which is inclined at 30° to the vertical.

What is the total vertical load of these four loads on A?

Question 2

A retaining wall is shown in Diagram Q.2.
What is the factor of safety against overturning at A?

Question 3

Diagram Q. 3 shows an embankment.
What extra loads per unit length are to be carried at A and B due to the embankment load?

Question 4

A wall of height 15m holds a soil of the following properties: dry unit weight of 18kN/m^3, cohesion of 20kN/m^2, and an angle of internal of 30°. Draw the pressure diagram.

What is the minimum surcharge that will have to be supported by the wall to avoid tension crack?

Determine the active force in the soil with a surcharge of 100kN/m^3. Hence, determine also the total active force and its location.

Question 5

A wall ABCD is 15m long, with water hit at B, 4m below the surface. The following are the other information:

AB: dry density = 15kN/m^3, cohesion = 0, angle of internal friction = 30°,

CD: depth = 5m, saturated density = 19kN/m^3, cohesion = 0, angle of internal friction = 35°, and

CD: saturated density = 20kN/m^3, cohesion = 0, angle of internal friction = 35°.

Draw the active pressure diagram. Hence, determine the total active force and its location.

Question 6

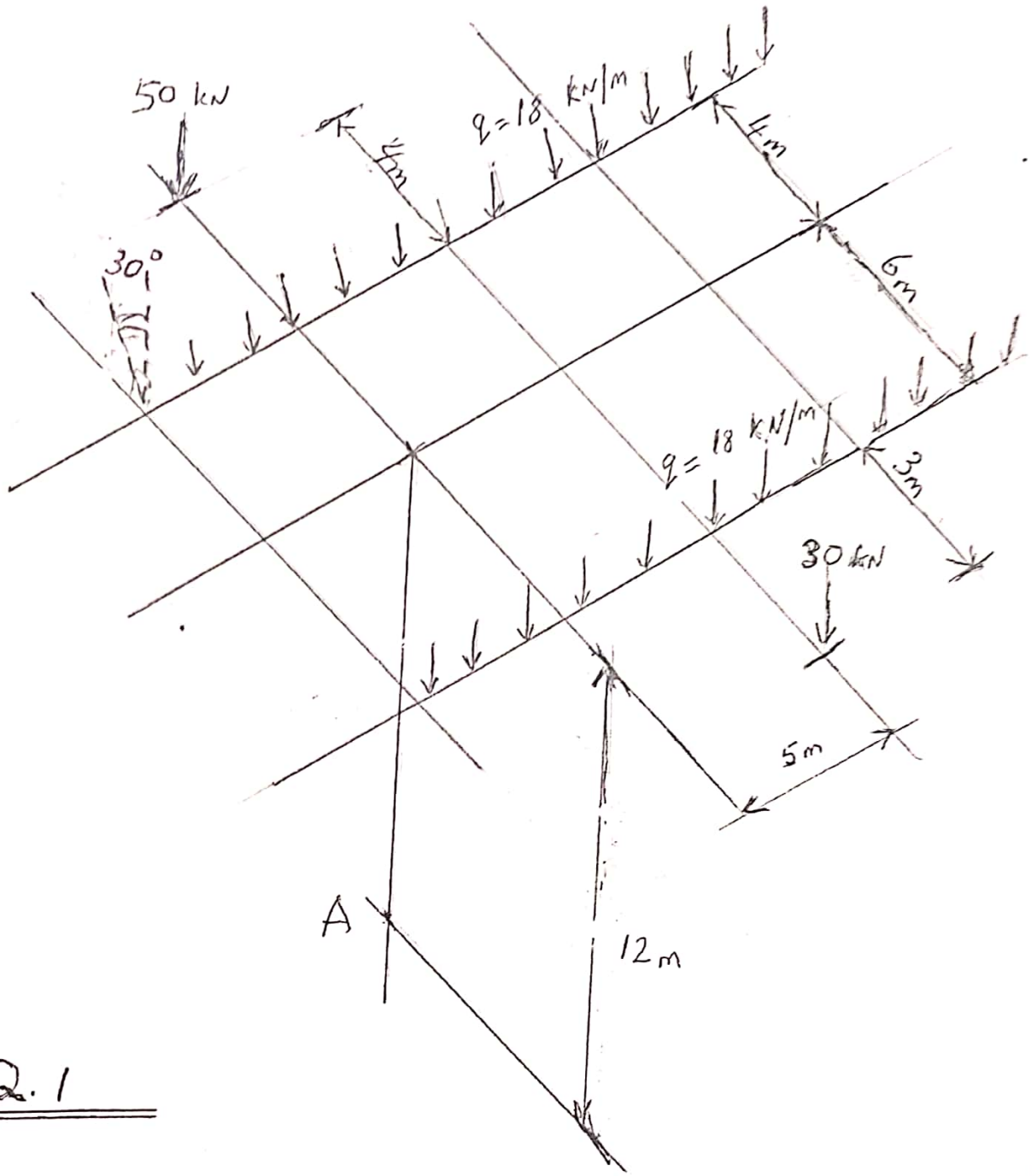
A wall PQRS is 15m long, with water hit at Q, 4m below the surface. The following are the other information:

PQ: dry density = 15kN/m^3, cohesion =0, angle of internal friction = 30°,

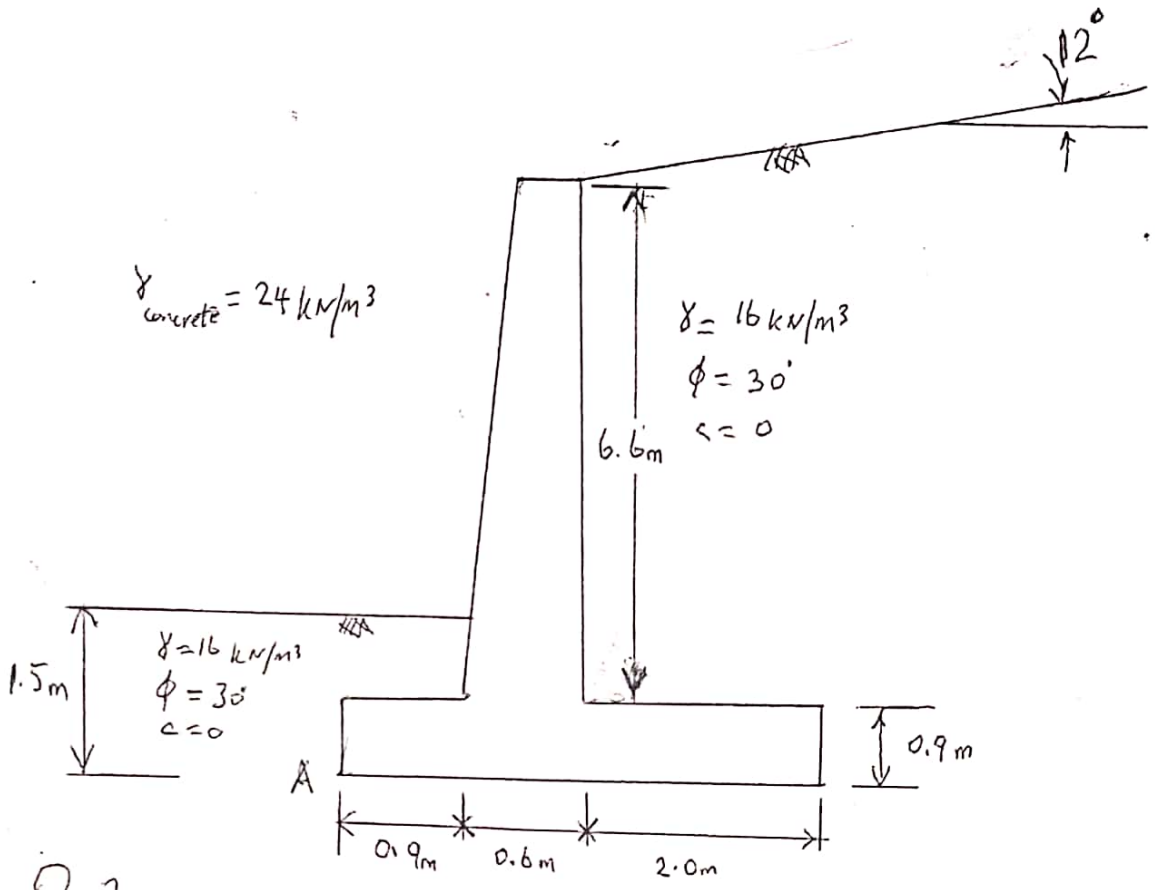
QR: depth = 5m, saturated density = 19kN/m^3, cohesion = 0, angle of internal friction = 35°, and

RS: saturated density = 20kN/m^3, cohesion = 0, angle of internal friction = 35°.

Draw the passive pressure diagram. Hence, determine the total passive force and its location.



Q. 1



Q.2

γ = 18 kN/m³

ϕ = 36°

c = 200 kN/m²